Workshop on Age Reading of Chub Mackerel *(Scomber colias)* [WKARCM]
Lisbon (Portugal), 2 – 6 November 2015

Review information on age estimation, otolith exchanges and validation techniques of Chub mackerel (TOR a)

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BACKGROUND OF THE AGE DETERMINATION OF CHUB MACKEREL *(S. colias)* IN EUROPEAN WATERS

- Chub mackerel is not an assessed species
- There is not yet an international age reading protocol, nore any consensual age reading criteria
- One expert reader (IPMA, Portugal) for many years (now retired)
- Occasional readers in some Mediterranean countries
- November 2011: training of two new readers (Spain and Portugal) by expert reader in Lisbon
- Since 2011 appear new permanent readers (Spain, Portugal, Italy, Greece, ...)
- PGCCDBS 2011 recommends the realization of first otolith exchange of chub mackerel between Portugal and Spain
- PGCCDBS 2014 recommends the realization of first Workshop on Age Reading of Chub Mackerel for all European countries

OTOLITH EXCHANGES OF CHUB MACKEREL

- 2012-2013: First *S. colias* otolith exchange.
  - Five readers from Portugal (2) and Spain (3)
  - 244 otoliths (ICES areas VIIIc and IXa and Western Mediterranean)

- March-June 2015: Small exchange of S. colias otolith images before this Workshop.
  - 14 readers from Portugal (6), Spain (6) and Italy(2)
  - 125 otolith images (ICES areas VIIIc and IXa and Western Mediterranean)

VALIDATION STUDIES OF CHUB MACKEREL

- Two indirect methods:
  - Marginal Increment Analysis / Edge Zone Analysis
    - Qualitative: Nature of the Edge (Opaque/Translucent)
    - Quantitative: RMD (Relative Marginal Distance) = AMD/Di,i-1

AMD (Absolute Marginal Distance) = Distance between the end of last hyaline annulus and the edge
Di, i-1 = Distance between the last two hyaline annuli

  - Length Frequency Analysis

Marginal Increment Analysis (Quantitative) / Edge Zone Analysis (Qualitative), (ICES CRR, 2015)

Area	Method	Time series	Age/size Range	References
Bay of Biscay	Quantitative / Qualitative	2011	All ages together / 19-42cm	Navarro et al., 2014
Portuguese Coast	Qualitative	1981-1982	All ages together	Martins et al., 1983
Azores Islands		1996-2002	All ages together / 9.6-53.5cm	Carvalho et al., 2002
Madeira Islands	Quantitative / Qualitative	2002-2004	All ages together / 19-41cm	Vasconcelos, 2006
Canary Islands	Qualitative	March 1988-July 1990	All ages together / 19.2-41.1cm	Lorenzo et al., 1995
Gulf of Cadiz		1977-1978	All ages together	Rodriguez-Rhoda, 1982
Gulf of Cadiz / SW Mediterranean (Alboran Sea)		Oct. 2003-Sep. 2004	All ages together / 17-40cm	Velasco et al., 2011
NW Mediterranean (Catalan Coast)		April - July 1992 and Dec. 1997	All ages together	Perrota et al., 2005
Eastern Mediterranean (Hellenic Seas)	Quantitative / Qualitative	Jan.-Dec. 1996	Ages 1-3	Kiparissis et al., 2000

Opaque edge formation of *S. colias* otoliths in different areas of NE Atlantic ocean and Mediterranean Sea, from the literature

	Area	Opaque edge	References
NE Atlantic Ocean	ICES, VIIIc. Bay of Biscay	June - November	Navarro et al., 2014
	ICES, IXa. Portugal waters	May - August	Martins et al., 1983
	ICES, IXaS. Bay of Cadiz	May - August	Rodriguez-Roda, 1982
	ICES, IXaS. Bay of Cadiz	March/April - September/October	Velasco et al., 2011
	ICES, X. Azores Islands	May - September/October	Carvalho et al., 2002
	Madeira islands	May - July (max.)	Vasconcelos, J., 2006
	Canary islands	March - September	Lorenzo et al., 1996
Mediterranean Sea	W Mediterranean Sea. Alboran Sea	March/April - September/October	Velasco et al., 2011
	W Mediterranean Sea. Catalonya waters	Spring - Summer (max. April-July)	Perrota et al., 2005
	E Mediterranean Sea. Hellenic Sea	March - September (max. April)	Kipparissis et al., 2000
	E Mediterranean Sea. Turkey waters	Summer	Tuggac, M., 1957

Length Frequency Analysis

Area	Time series	Age/size Range	References
Madeira Islands	2002-2004	Ages 0-5 / 13-41cm	Vasconcelos, 2006

Other methods: Back-calculation (no validation)

Area	Time series	Age/size Range	References
Madeira Islands	2002-2004	Ages 1-4 / 20-40cm	Vasconcelos, 2006
Canary Islands	March 1988-July 1990	Ages 1-7 / 19.2-41.1cm	Lorenzo et al., 1995
Gulf of Cadiz	1977-1978	Ages 0-2	Rodriguez-Rhoda, 1982

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